**Groovy 90 3A**

**Specifications**

- **Wing Span**: 65.5in / 1670mm
- **Wing Area**: 837 sq in / 54 sq dm
- **Flying Weight**: 8.4 lbs / 3800g
- **Fuselage Length**: 67 in / 1700mm

*Specifications are subject to change without notice.*

**Warning! This model is not a toy.**

It is designed for maximum performance. Please seek advice if one is not familiar with this kind of engine powered precision model. Operating this model without prior preparation may cause injuries. Remember, safety is the most important thing. Always keep this instruction manual at hand for quick reference.

The World Models Manufacturing Co., LTD.
www.theworldmodels.com

FACTORY PRE-FABRICATED
ALMOST-READY-TO-FLY (ARF) SERIES
MADE IN CHINA

A180R1103
BEFORE YOU BEGIN

1. Read through the manual before you begin, so you will have an overall idea of what to do.

2. Check all parts. If you find any defective or missing parts, contact your local dealer. Please DRY FIT and check for defects for all parts that will require CA or Epoxy for final assembly. Any parts you find to be defective after the gluing process may be difficult to remove for warranty replacement. The manufacturer will replace any defective parts, but will not extend to the parts that are good before gluing to defective parts during assembly. Warranty will not cover any parts modified by the customer.

3. Symbols used throughout this instruction manual comprise of the following:

- **AB**: Apply epoxy glue.
- **C.A.**: Apply instant glue (C.A. glue, super glue.)
- **L/R**: Assemble left and right sides the same way.
- **Ensure smooth non-binding movement while assembling.**
- **Peel off shaded portion covering film.**
- **Cut off shaded portion.**
- **Drill holes with the specified diameter (here: 3mm).**
- **Must be purchased separately!**
- **Pay close attention here!**
- **Warning!** Do not overlook this symbol!
- **Pierce the shaded portion covering film.**
**Parts List**

1. **MAIN WING** -- 1 pair

2. **SCREW PM2x25mm** -- 6 pcs
   - **FUEL TUBE Ø6x5mm** -- 4 pcs
   - **STRAPER** -- 2 pcs
   - **CLEVIS** -- 2 pcs
   - **TRI-HORN M3x14mm (L)** -- 2 sets
   - **PUSHROD Ø1.8x115mm w/ Threads (For Aileron)** -- 2 pcs

3. **STABILIZER & ELEVATOR** -- 1 set
   - **FUSELAGE** -- 1 pc.
   - **SCREW PA3x12mm** -- 2 pcs
   - **WASHER d3xD7mm** -- 2 pcs
   - **WASHER d4xD9mm** -- 2 pcs
   - **M4 NUT** -- 2 pcs
   - **M3 NUT** -- 2 pcs

4. **VERTICAL FIN & RUDDER** -- 1 set
   - **WHEEL Ø30mm** -- 1 pc.
   - **FUEL TUBE Ø6x5mm** -- 2 pcs
   - **CLEVIS** -- 2 pcs
   - **TRI-HORN M3x14mm (L) (w/o Base For Rudder)** -- 2 sets
   - **PUSHDROD Ø1.8x105mm (For Elevator)** -- 1 pc.
   - **WING INCIDENCE ANGLE ADJUSTER** -- 4 sets

5. **CARBON FIBER MAIN LANDING GEAR** -- 1 set
   - **WHEEL PANTS** -- 1 pair
   - **SCREW PM3x15mm** -- 6 pcs
   - **SCREW PM4x40mm** -- 2 pcs
   - **NYLON BOLT M3x18mm** -- 2 pcs
   - **WASHER d4xD9mm** -- 2 pcs
   - **WASHER d3xD12mm** -- 6 pcs
   - **WIRE Ø3x114mm** -- 1 pc.

6. **ENGINE MOUNT PL5911080** -- 1 set
   - **SCREW PM4x25mm** -- 4 pcs
   - **WASHER d4xD12mm** -- 4 pcs

7. **WING INCIDENCE ANGLE ADJUSTER** -- 4 sets

8. **ENGINE MOUNT PL5911080** -- 1 set
   - **WASHER d4xD12mm** -- 4 pcs

9. **FUEL TANK 380cc** -- 1 set
   - **CLEVIS** -- 2 pcs
   - **BALSAL 10x10x115mm (For Fixing Fuel Tank)** -- 1 pc.
   - **RUBBER BAND 6x60mm (L)** -- 2 pcs

10. **FUEL TANK 380cc** -- 1 set
    - **BALSAL 10x10x115mm (For Fixing Fuel Tank)** -- 1 pc.
    - **RUBBER BAND 6x60mm (L)** -- 2 pcs

11. **THROTTLE PUSHDROD Ø1.2x275mm** -- 1 pc.
    - **W/ Plastic tube d2xD3x130mm** -- 1 pc.
    - **ALUMINUM PLATE (For Engine Mount)** -- 1 pc.
    - **ANTIVIBRATION MOUNT 4C-91** -- 1 set
    - **INCLUDE:** **SOCKET HEAD SCREW M4x35mm** -- 4 pcs
    - **SCREW KM3x20mm** -- 8 pcs
    - **WASHER d4xD12mm** -- 8 pcs
    - **M3 NYLON INSERT LOCK NUT** -- 8 pcs
    - **M4 NYLON INSERT LOCK NUT** -- 4 pcs

12. **LINKAGE CONNECTOR Ø2.1mm** -- 1 set

13. **SPONGE 67x70x115mm (For Radio Equipment)** -- 1 pc.
    - **Y CONNECTOR PL4410010** -- 1 set
    - **STRAPER** -- 1 pc.
    - **FUEL TUBE Ø6x5mm** -- 1 pc.
    - **RIGGING Z BEND Ø1.8x27mm (For Rudder)** -- 2 pcs
    - **COPPER TUBE Ø2.5x3.2x8mm (For Rudder)** -- 2 pcs
    - **PUSHDROD Ø1.8x105mm (For Elevator)** -- 1 pc.
    - **WING INCIDENCE ANGLE ADJUSTER** -- 4 sets

14. **SCREW PM3x25mm** -- 1 pc.
    - **SCREW PA3x25mm** -- 1 pc.
    - **WASHER d3xD7mm** -- 2 pcs
    - **WING TUBE Ø22x72mm** -- 1 pc.

15. **CANOPY** -- 1 set
    - **PILOT PC001063A** -- 1 pc.
    - **DOUBLE-SIDED TAPE** -- 1 pc.
    - **SCREW PWA2.3x8mm** -- 4 pcs
    - **SCREW PWA2.6x12mm** -- 4 pcs
    - **SILICON GROMMET d1.5xD6.5mm** -- 4 pcs
    - **WASHER d3xD7mm** -- 2 pcs

16. **COWLING** -- 1 set
    - **TRANSPARENT DUMMY COWLING** -- 1 pc.
    - **SCREW PWA2.3x8mm** -- 6 pcs
    - **SCREW PWA2.6x12mm** -- 4 pcs
    - **SILICON GROMMET d1.5xD6.5mm** -- 10 pcs
    - **SPINNER (w.alu.back plate) Ø70mm** -- 1 set

17. **DECALS** -- 1 set

**COVERING:**

- TOUGHLON STL 100 WHITE
- TOUGHLON STL 561 PEARL PURPLE
- TOUGHLON STL 550 PEARL BLUE
- TOUGHLON STL 361 PURPLE
- TOUGHLON STL 511 PEARL FERRARI RED
- TOUGHLON STL 360 VIOLET
- TOUGHLON STL 251 SKY BLUE
1 Main Wing

- Apply instant type CA glue to both sides of each hinge.

2 Aileron Servo

- Ø1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at under side of control surfaces.

3 Stabilizer / Elevator

- Apply instant type CA glue to both sides of each hinge.
4 Vertical Fin & Rudder

- Apply instant type CA glue to both sides of each hinge.

5 Tail Landing Gear

- PA3 x 12mm Screw: 2
- 2.6mm Collar: 1
- Bottom View

6 Main Landing Gear

- PM3x15mm Screw: 6
- PM4x40mm Screw: 2
- M3x18mm NYLON BOLT: 2
- 4.1mm Collar: 4
- d4x9mm Washer: 2
- d3x12mm Washer: 2
- M3 Nut: 6
- M4 Nut: 2
- Bottom View
- Completed
7 **Rudder Pullwire**

- ø1mm pilot for holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at side of control surfaces.

8 **Elevator Pushrod**

- ø1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at under side of control surfaces.

9 **Engine Mount**

- Apply thread locker to screws.

- Blind nuts are off-centered to keep the spinner at the fuselage axis.
10 Fuel Tank

Install Balsa 10 x 10 x 115mm (For fixing fuel tank)

Rubber Band

Fuel Tank 380cc

11 Engine

M4 x 35mm SOCKET HEAD SCREW 4

KM3 x 20mm Screw 8

M4 Nylon Insert Lock Nut 4

M3 Nylon Insert Lock Nut 8

d4 x D12mm Washer 8

ANTI-VIBRATION MOUNT INSTALLATION

KM3 x 20mm

Make sure the rounded edges are facing the shock absorbing SILICON PAD.

Install Balsa 10 x 10 x 115mm (For fixing fuel tank)
12 Servo Set

Please refer to attached sheet for linkage connector installation.

13 Radio Equipment

Install and arrange the servo as shown in the diagram.

- Copper Tube
- Press down the center 1/3 portion
- Elevator Servo
- Rudder Pullwire Ø1×1170mm
- Rudder Servo
- Sponge
- Fuel Tube Ø6×5mm
- Elevator Pushrod Ø1.8×900mm
- Elevator Servo
- Throttle Servo
- Throttle Pushrod Ø1.2×275mm
- RIGGING Z BEND Ø1.8×27mm
- KM 2×8mm
- M2 nut
Step 1. Insert the aluminum wing tube with the pre-drilled hole end into the right wing. Align the lines marked at the wing root and wing tube, then apply the PM3 x 25mm machine screw through the pre-drilled hole on top of the wing. (please confirm the alignment of the hole by putting a 2.5mm diameter rod through the pre-drilled wing hole before applying the screw.) The hole on the wing tube is pre-threaded, do not over tighten the PM3 screw, the setup is for future removal of the wing.

Step 2. Install the right wing to the fuselage by inserting the wing tube (now attached to the right wing) through the fuselage, then install the left wing.

Step 3. Make sure the wings are resting against the fuselage tightly. Locate the pre-drilled 2.5mm hole at top of left wing, and drill along with 2.5mm drill bit until it passes through the wing tube. Apply the PA3 x 25mm self-tapping screw.

Note: It is recommended that the wing tube stays with the left wing. Removal of the wings could be achieved by removing the right wing machine screw, the right wing then the left wing with wing tube. If removal of wing tube from left wing is also required, it is recommended that instead of applying self-tapping screw in step 3, you pre-tap with M3 thread cutter and apply M3 machine screw.
15 Canopy & Pilot

- First insert the grommet to the canopy then apply screw.

L/R

16 Cowling

L/R
Wing Setting

Adjust the wing and fuselage configuration as shown in the diagrams.

A180 GROOVY 90-3A

ENGINE
DOWN THRUST
ANGLE 1°

MAIN WING
INCIDENCE
ANGLE 0°

STABILIZER
INCIDENCE
ANGLE 0°

Stabilizer Setting

TO INCREASE INCIDENCE ANGLE, LOOSE BOTTOM SET SCREW AND THEN TIGHTEN TOP SET SCREW. TO REDUCE INCIDENCE ANGLE, LOOSE TOP SET SCREW AND THEN TIGHTEN BOTTOM SET SCREW. DON'T OVERTIGHTEN SET SCREWS AS THE INCIDENCE ANGLE ADJUSTER ARE MADE OF PLASTICS.
**Important Safety Precautions**

# First time flyer should never fly by himself / herself. Assistance from experienced flyer is absolutely necessary.

# Pre-flight adjustment must be done before flying, it is very dangerous to fly a badly pre-adjusted aircraft.

# **Groovy 90** is specially designed to be powered by **4c 0.91** engine, using a more powerful engine does not mean better performance. In fact, over powered engine may cause severe damage and injuries.

# Make sure the air field is spacious, never fly the plane too close to people and never get too close to a running propeller.

# If you find wrinkles on the covering as a result of weather changes, you can use hot iron to remove the wrinkles. Please begin with lower temperature setting and gradually raise the temperature until the wrinkles are gone. Too hot an iron may damage the covering.

# Check and re-tighten up all factory assembled screws, use thread locker if applicable.

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**Control Throws**

Adjust the control throws as shown in the diagram. These throws are good for general flying. You can adjust according to your personal preference.

- **Elevator**: 25mm
- **Rudder**: 60mm
- **Ailerons**: 20mm

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**C.G.**

The ideal C.G. position is 160mm (6.3 in.) behind the leading edge measured at where the wing meets the fuselage. In order to obtain the C.G. specified, add weight to the fuselage or move the battery position. Check the C.G. before flying. If you are converting this model to electric, please move the C.G. forward 10% of current C.G. distance from leading edge to compensate for weight of fuel.

The ideal C.G. position is 160mm (6.3 in.) behind the leading edge measured at where the wing meets the fuselage. In order to obtain the C.G. specified, add weight to the fuselage or move the battery position. Check the C.G. before flying. If you are converting this model to electric, please move the C.G. forward 10% of current C.G. distance from leading edge to compensate for weight of fuel.

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Usage of the transparent 3D template

This transparent 3D template is used for position guidance of the actual cutting of the pre-painted cowling.

Simply cut the transparent 3D template to fit your engine and exhaust pipe, then slide onto the actual cowling and use as template to mark the openings required for final cutting.
Ducted Fan

Pattern

Warbirds

Funfly

Scale

Electric

Sports

Glider

Trainer

Boat

Accessories

Covering

(Lightex / Toughlon)